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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,453	12/26/2001	Shinji Nagashima	216944US-3 DIV	4194
22850	7590	10/03/2003	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			JOLLEY, KIRSTEN	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/025,453	NAGASHIMA, SHINJI	
	Examiner	Art Unit	
	Kirsten C Jolley	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/611,664.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>12/26/01</u> | 6) <input type="checkbox"/> Other: . |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

The Examiner suggests that on page 1, lines 8-9, the phrase "the entire contents of which are incorporated herein by reference" is deleted because it is improper U.S. practice to incorporate a foreign document by reference.

On page 3, lines 13 and 16, it appears that "ununiformity" should be --nonuniformity--.

The following typographical errors are noted: On page 14, line 1, it appears that "fist" should be --first--. On page 21, line 18, it appears that "form" should be --from--.

On page 28, line 7, it is requested that the chemical names for "PGME" and "PMA" are spelled out since it is the first time the acronyms appear in the specification.

Appropriate correction is required.

Claim Interpretation

2. The phrases "wherein said step (a), said step (b), said step (c), and said step (d) are performed continuously" in claim 7, lines 14-15, and "wherein said step (a), said step (b), and said step (c) are performed continuously" in claim 10, lines 11-12, have been interpreted as requiring the steps are performed without interruption, i.e., in the same unit/apparatus, because Merriam-Webster's Collegiate Dictionary, 10th Edition defines "continuous" as "marked by uninterrupted extension in space, time, or sequence" and because the specification defines the continuous processing as occurring within the same processing unit on page 25, in order to save

Art Unit: 1762

time and labor required for carrying the wafer in and out as compared with the first embodiment disclosed in Applicant's invention.

3. In claims 4 and 5, "the predetermined processing solution temperature" has been interpreted as referring to the solution temperature of the first processing solution because claims 4 and 5 depend from claim 3, which states a limitation of regulating the temperature of the first processing solution. The Examiner suggests that the claims are amended to clarify that the predetermined processing solution temperature is regulated for the *first* processing solution.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Hayashi et al. (US 6,350,316).

With respect to claims 1 and 6, Hayashi et al. discloses a substrate processing method comprising the steps of: spreading a first adhesion promoter solution over the front surface of a substrate by spin coating in coating process unit 13, followed by controlling the temperature of the wafer by cooling plates 24, 26, and then spin coating a second coating solution (interlayer dielectric insulating film) on the substrate surface of which the temperature is regulated in coating process unit 12 (col. 13, lines 6-31).

Art Unit: 1762

As to claim 2, while Hayashi et al. does not specifically teach a step of drying the first processing solution spread over the front surface of the substrate prior to applying the second solution on the surface, it is the Examiner's position that some drying inherently occurs while the substrate is still in the first coating process unit 13 and while on cooling plates 24, 26 because since the adhesion promoter solution is a very low viscosity solution of 1-methoxy-2-propanol *at least some* drying would inherently occur due to volatilization.

6. Claims 1-3, 7-8, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Takamori et al. (US 6,306,455).

With respect to claim 1, Takamori et al. discloses a substrate processing method comprising the steps of: spreading a first solution (solvent) over the front surface of a substrate by spin coating in a coating unit illustrated in Figure 8, regulating the temperature of the substrate (including its surface) by a heater H1 or cooler P1 in the spin chuck, and spreading a second solution (resist solution) over the front surface of the substrate by spin coating, whereby the temperature of the substrate is regulated (col. 17, line 38 to col. 18, line 18).

As to claim 2, it is noted that the first processing solution spread over the substrate surface is inherently dried, at least to some extent, prior to spreading the second resist solution because the first processing solution is a solvent and volatilization/evaporation starts occurring immediately after it is deposited on the substrate.

As to claim 3, Takamori et al. teaches regulating the temperature of the first processing solution at a predetermined processing solution temperature before spreading over the substrate surface in col. 8, lines 61-67. Takamori et al. states that the solvent supply passage has a

Art Unit: 1762

temperature control mechanism in order to set the solvent at a predetermined desired temperature.

With respect to claims 7 and 10, Takamori et al. teaches spreading a first processing solution (solvent) over the front surface of the substrate, performing heat processing and regulating the temperature of the coated substrate via heater H1 or cooler P1 in the spin chuck, and spreading a second processing solution (resist) over the front of the substrate of which the temperature is regulated, as discussed above. Because each of the above steps occur within the same processing unit either simultaneously or sequentially, the steps meet the limitation of being performed continuously.

As to claim 8, Takamori et al. teaches regulating the temperature of the substrate (including its front surface) immediately before coating with the first processing solution by cooling the substrate in cooling unit 21 (col. 17, lines 24-38).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takamori et al. (US 6,306,455).

As to claims 4 and 5, Takamori et al. teaches that the substrate may be heated via heater H1 in the spin chuck in the step of regulating the temperature of the surface of the substrate, or it

Art Unit: 1762

may be cooled via cooler P1 in the spin chuck. Takamori et al. teaches that the desired temperature of the first processing solution (solvent) is about 23 degrees C (col. 13, lines 11-16). Takamori et al. teaches that the temperature of the spin chuck varies depending upon the ambient temperature of the processing chamber (col. 17, lines 18-20). It would have been obvious for one having ordinary skill in the art to have adjusted the temperature of the spin chuck either above or below 23 degrees C (the temperature of the first processing solution) by heating or cooling, via elements H1 or P1 respectively, depending upon the ambient temperature of the processing chamber detected by temperature sensor 25 and the target process temperature of the chamber (col. 18, lines 16-18).

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takamori et al. (US 6,306,455) as applied to claim 7 above, and further in view of Nakayama et al. (US 4,790,262).

Takamori et al. lacks a teaching of performing the heat processing via heater H1 or cooler P1 in the spin chuck in an inert atmosphere. Nakayama et al. teaches applying a thin film by spin coating whereby an inert atmosphere such as N₂ gas is introduced into the processing unit in order to reduce the moisture in the air to prevent moisture absorption by the coating solution, thereby preventing changing of the coating properties due to moisture absorption (col. 1, lines 38-44 and col. 3, lines 21-31). It would have been obvious for one having ordinary skill in the art to have incorporated the use of an inert atmosphere in the coating unit 30 of Takamori et al. in order to reduce moistures in the atmosphere of the coating unit, in order to prevent any change of

Art Unit: 1762

the coating properties due to the presence of moisture and thereby improve the uniformity of Takamori et al.'s resist coating.

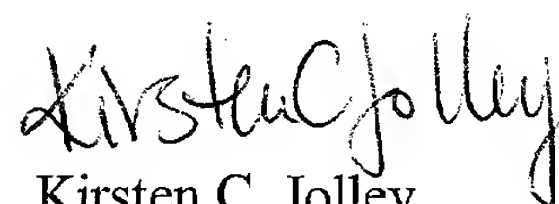
Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Akimoto et al. (US 6,004,047), Takekuma et al. (US 5,580,607), Sugimoto et al. (US 5,762,709), and Nunotani et al. (US 6,001,417) are cited to demonstrate the state of the prior art with respect to the instant invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C Jolley whose telephone number is 703-306-5461. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on 703-308-2333. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193.


Kirsten C. Jolley
Patent Examiner
Technology Center 1700

kcj